WHAT IS CLAIMED IS:

1. A multi-layered structure comprising

a substrate,

formed on the metallic substrate, a first monomolecular layer composed of monomers of a first selected polycyclic aromatic compound having a defined axis oriented substantially normal to the plane of the monolayer, with the monomers forming the monolayer being covalently attached at one axial end to the substrate, and

a second monomolecular layer composed of monomers of a second selected polycyclic aromatic compound having a defined axis oriented substantially normal to the plane of the monolayer, with the monomers forming the monolayer being covalently attached at one axial end to an axial end of molecules forming the first monolayer.

2. A multilayered structure according to claim 1 wherein said axis is a z axis and each of the monomolecular layers being characterized by in-plane ordering.

3. A multilayered structure according to claim 1 wherein said selected polycyclic aromatic compound is planar.

4. A multi-layered structure according to claim 1, wherein the monomers in the first monolayer are covalently attached to molecules in the second monolayer through bifunctional reagent molecules forming a monomolecular

coupling layer between the two layers formed of polycyclic aromatic compounds.

5. A multi-layered structure according to claim 4 including a bifunctional reagent that is electrically conducting.

6. A multi-layered structure according to claim 5 wherein the electrically conducting bifunctional reagent is selected from oligothiophene and oligoaniline.

7. The multilayered structure of claim 4 including a bifunctional reagent that is electrically insulating.

8. The multilayered structure of claim 5 wherein the electrically insulating bifunctional reagent is selected from $-(CH_2)_n-$, where n is between 1 and 5, and $\Phi-(CH_2)_n-\Phi$, where n is between 0 and 5 and Φ represents a phenyl.

9. A multilayered structure according to claim 1, which includes a first number of layers of a first selected polycyclic compound and a second number of layers of a second selected polycyclic compound.

10. A multilayered structure according to claim 9, wherein the first and second polycyclic compounds are perylene and naphthalene tetracarboxylic-dianhydride compounds, respectively.

11. The multilayered structure of claim 9, wherein the selected compound is formed by polycyclic compound having

axial amine groups, and the bifunctional reagent is a bismaleimide compound.

12. The composition of claim 11, wherein the selected compound is a diamino carbozole.